yeast apparently has a surface tension of about 0.60. The article seems to clear away much of the haze that has surrounded the matter of the significance of surface tension in cell activity.—WILLIAM CROCKER.

Underground organs of weeds.—Conflicting statements by various authors have induced PAMMEL and FOGEL[23] to investigate the organs of vegetative reproduction of some of our most common weeds. The Canada thistle (*Cirsium arvense*), the horse nettle (*Solanum carolinense*), the milkweed (*Asclepias syriaca*), and the bindweed (*Convolvulus arvensis*), were all found to be propagated by horizontal roots bearing adventitious buds; while in the wild morning glory (*Convolvulus Sepium*) and the quack grass (*Agropyron repens*), the organs of vegetative multiplication are rootstocks. In some instances the roots and subterranean stems resembled each other so closely that only by microscopic examination could the difference be detected.—GEO. D. FULLER.

Epidermis and light refraction.—FRIMMEL[24] thinks he has shown that the lower papillate epidermis of the leaves of the yew gives a total refraction of the light passing through the leaf from above, thereby leading to the use of all light that enters the leaf. He relates this character to the ability of the tree to grow in shaded habitats. He believes the lower epidermis of a number of other conifers acts in the same way. He finds a similar contrivance in the spongy parenchyma of the cotyledon of the beech. The fact of total refraction in the yew seems entirely established; whether it is of biological significance or not is quite another question.—WILLIAM CROCKER.

Arctic vegetation.—Hare Island off the coast of West Greenland, an uninhabited island 66 square miles in area, has been visited several times by PORSILD,[25] who has found a flora consisting of 82 arctic and 30 subarctic species. The vegetation belongs to the fell-field formation, large areas quite devoid of plants, passing into a poorly developed heath with arctic meadows and bogs in the more sheltered situations. Dispersal is almost entirely through the agency of the wind over the surface of the snow and frozen seas. The subarctic species are regarded as relics of milder climate in post-glacial times.—GEO. D. FULLER.

Pneumatophores.—From an examination of the tissues of vertical apogeotropic branches of the roots of *Terminalia Arjuna*, a large tree of Central India,

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[23] PAMMEL, L. H., and FOGEL, ESTELLE D., The underground organs of a few weeds. Proc. Iowa Acad. Sci. **16**:pp. 7. *pls. 5*. 1909.

[24] FRIMMEL, FRANZ V., Die untere Kutikula des *Taxus*-Blattes ein Lichtreflektor Oester. Bot. Zeitsch. **61**:216–223. *figs. 4*. 1911.

[25] PORSILD, MORTEM P., The plant life of Hare Island off the coast of West Greenland. Saertryk af Meddelelser om Gronland **47**:252–274. *figs. 10*. Kobenhavn: Bianco Lunos. 1910.

ADAMSON[26] decides that they are developed "for purposes of aeration as shown by the great development of lacunar tissue." Both the horizontal and the vertical roots possess very loose cortical tissue with large lacunae, but most botanists would probably hesitate to pronounce upon the purpose of its development. The upright roots have well developed root caps, and possess no lenticels or other stem characters found in many pneumatophores.—GEO. D. FULLER.

Seed of Neuropteris.—In 1904 KIDSTON described the seed of *Neuropteris heterophylla*, which was said to be "as large as a hazelnut." Now the same investigator, associated with JONGMANS, has described[27] the seed of *N. obliqua* Brong., the specimens being in the Rijks Herbarium at Leyden. The seeds have the same general structure as those of *N. heterophylla*, but are about twice as large. This species of *Neuropteris* is also doubtless to be referred to the stem genus *Medullosa*.—J. M. C.

Root parasites.—MISS BENSON[28] has studied the structure of some haustoria on the roots of *Exocarpus* and *Thesium*, showing the nature of the penetration and connection with the roots of other plants. For a portion of the lignified elements of the haustoria the name "phloeotracheids" is suggested, and the investigator thinks they may act as a filter between the host and parasite, although the evidence that they have any such function does not seem to be at all convincing.—GEO. D. FULLER.

Calcium salts and fungi.—WEIR[29] concludes that soluble calcium salts are necessary to the complete development of higher fungi. *Coprinus plicatilis*, *C. papillatus*, *C. nivens*, and *C. ephemoides* showed little if any mycelial development, and no development of fruit heads or spores, when all the calcium present was in the form of the oxalate.—WILLIAM CROCKER.

A bog in central Illinois.—GATES[30] has instanced the meeting of northern and southern forms in a bog in central Illinois.—GEO. D. FULLER.

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[26] ADAMSON, R. S., Note on the roots of *Terminalia Arjuna*. New Phytol. **9**: 150–156. *figs. 3–7*. 1910.

[27] KIDSTON, R., and JONGMANS, W. J., Sur la fructification de *Neuropteris obliqua* Bgt. Archiv. Néerl. Sci. III. B. **1**:25, 26. *pl. 1*. 1911.

[28] BENSON, MARGARET, Root parasitism in *Exocarpus* (with comparative notes on the haustoria of *Thesium*). Ann. Botany **24**:667–677. *pl. 65. figs. 4*. 1910.

[29] WEIR, JAMES R., Benötigt der Pilz *Coprinus* Kalksalze zu seinen physiologischen Funktionen. Flora **103**:87–90. 1911.

[30] GATES, F. C., A bog in central Illinois. Torreya **11**:205–211. 1911.